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**TITLE:** Resin composition for laminate and foodstuffs packaging, comprises ethylene-vinyl acetate copolymer saponified compound, polyamide group resin with preset melting point, and olefin-unsaturated carboxylic acid copolymer

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**ABSTRACTED-PUB-NO:** JP 2002338770 A

**BASIC-ABSTRACT:**

NOVELTY - A resin composition comprises ethylene-vinyl acetate copolymer saponified compound (A), a polyamide group resin (B) with melting point of 160degreesC or less, olefin-unsaturated carboxylic acid copolymer and/or olefin-unsaturated carboxylic acid-unsaturated carboxylic acid ester copolymer (C).

DESCRIPTION - An INDEPENDENT CLAIM is included for laminate which consists of a thermoplastic resin layer containing the resin composition, on at least one side.

USE - For laminate (claimed) and molded products. For packaging, such as foodstuffs, drinks, cosmetics, pharmaceuticals, heavy chemicals, agrochemicals, solvent and fuel.

ADVANTAGE - The resin composition has excellent gas barrier property, ductility and pinhole-proof property.

#### **EQUIVALENT-ABSTRACTS:**

##### **POLYMERS**

Preferred Composition: The weight ratio of ethylene-vinyl acetate copolymer saponified compound (A) and polyamide group resin (B), is 50/50-99/1. The content of olefin-unsaturated carboxylic acid copolymer and/or olefin-unsaturated carboxylic acid-unsaturated carboxylic acid ester copolymer (C), is 1-50 weight parts (wt.pts) with respect to 100 wt.pts of total of compound (A) and resin (B). The weight ratio of resin (B) and copolymer (C), is 50/50-99/1. Preferred Copolymer: The olefin-unsaturated carboxylic acid copolymer and/or olefin-unsaturated carboxylic acid-unsaturated carboxylic acid ester copolymer (C) is an ionomer of ethylene-(meth)acrylic acid copolymer or ethylene-(meth)acrylic acid copolymer. The olefin-unsaturated carboxylic acid-unsaturated carboxylic acid ester copolymer (C) is an ionomer of ethylene-(meth)acrylic acid-(meth)acrylic acid ester copolymer or ethylene-(meth)acrylic acid-(meth)acrylic acid ester copolymer.

Ethylene vinyl acetate copolymer saponified compound (in weight parts) (85), polyamide group resin (15) with melting point of 133degreesC, and ethylene-methacrylic acid copolymer (10), were mixed, and a resin composition was obtained. The resin composition had excellent gas barrier property, ductility and pinhole-proof property.

**TITLE-** RESIN COMPOSITION LAMINATE FOOD PACKAGE COMPRISE ETHYLENE  
**TERMS:** VINYL ACETATE COPOLYMER SAPONIFICATION COMPOUND POLYAMIDE  
GROUP PRESET MELT POINT OLEFIN UNSATURATED CARBOXYLIC ACID

**DERWENT-CLASS:** A17 A23 A92 P73

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**Notes:**

1. Untranslatable words are replaced with asterisks (\* \*\*).
2. Texts in the figures are not translated and shown as it is.

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## CLAIM + DETAILED DESCRIPTION

### [Claim(s)]

[Claim 1] an ethylene-vinyl acetate copolymer saponification thing (A) and the melting point -- polyamide system resin (B) 160 \*\* or less and me -- a fin unsaturated carboxylic copolymer and/or me -- a resin composition which contains a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C), and is characterized by things.

[Claim 2] The resin composition according to claim 1 in which an ethylene-vinyl acetate copolymer saponification thing (A) and the melting point are characterized by content weight ratios (A/B) of polyamide system resin (B) 160 \*\* or less being 50 / 50 - 99/1.

[Claim 3] me. [ fin unsaturated carboxylic copolymer ] and/or, me -- to total quantity (A+B) 100 weight section of polyamide system resin (B) 160 \*\* or less. [ content of a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) ] [ an ethylene-vinyl acetate copolymer saponification thing (A) and the melting point ] The resin composition according to claim 1 or 2 being one to 50 weight section.

[Claim 4] the melting point -- polyamide system resin (B) 160 \*\* or less and me -- a fin unsaturated carboxylic copolymer and/or me. [ that content weight ratios (B/C) of a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) are 50 / 50 - 99/1 ] Any of Claims 1-3 by which it is characterized, or a resin composition of a description.

[Claim 5] me -- a fin unsaturated carboxylic copolymer and/or me. [ that a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) is eye ONOMA of an ethylene (meta-) acrylic acid copolymer or an ethylene (meta-) acrylic acid copolymer ] Any of Claims 1-4 by which it is characterized, or a resin composition of a description.

[Claim 6] me. [ that a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) is eye ONOMA of an ethylene (meta-) acrylic acid-(meta-) acrylic ester copolymer or an ethylene (meta-) acrylic acid-(meta-) acrylic ester copolymer ] Any of Claims 1-4 by which it is characterized, or a resin composition of a description.

[Claim 7]A layered product having a thermoplastic resin layer at least on one side of a layer containing any of Claims 1-6, or a resin composition of a description.

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[Detailed Description of the Invention]

[0001]

[Field of the Invention][ this invention ] [ about the resin composition which used the ethylene-vinyl acetate copolymer saponification thing (it is hereafter written as EVOH), and its layered product ] It is related with the layered product using the resin composition which can acquire the molded product in which gas-barrier Hitoshi after crookedness fatigue when ductility, pinhole-proof nature, and a multilayer oriented film are used in detail has been improved, and this resin composition.

[0002]

[Description of the Prior Art]Generally, EVOH is excellent in transparency, a gas-barrier \*\* smell retaining property, solvent resistance, oil resistance, etc.

Taking advantage of this characteristic, it is used for various packaging materials, such as a food packaging material, packaging-of-medical-products material, an industrial-chemicals packaging material, and an agricultural-chemicals packaging material, and heating extension processing is carried out for the purpose of the improvement in the mechanical strength in many cases, and this EVOH serves as demand performance also with important extension performance.

[0003]However, EVOH is inferior to heating ductility compared with thermoplastics, such as polyolefin system resin and polystyrene system resin, and blending polyamide system resin to EVOH is performed as this measure. For example, JP,S63-114645,A has disclosed a blend thing with copolymerization nylon whose EVOH and melting point the heating extension multilayer structure which has a resin composition layer which consists of EVOH and fatty series copolymerization nylon is indicated, and are 155 \*\* concretely as this resin composition.

[0004]

[Problem to be solved by the invention]However, the place which this invention person examined in detail about the above-mentioned blend thing, Although the improvement effect of heating extension fabrication nature is accepted to some extent, for example about 60-80 \*\* when a monolayer film is comparatively extended at low temperature, In the place where thickness nonuniformity etc. may be seen at, the improvement effect of this heating extension fabrication nature may not fully be demonstrated at, and the further improvement is desired, It becomes clear that the GASUBARIA nature by crookedness fatigue when the pinhole-proof nature and the multilayer oriented film use at the time of crookedness fatigue when a film is

used are presented falls, and an improvement is just going to desire also about this point. That is, the places made into the purpose of this invention are a ductile improvement at low temperature, and the improvement of the pinhole-proof nature at the time of crookedness fatigue, or GASUBARIA nature.

[0005]

[Means for solving problem]As a result of repeating research wholeheartedly in view of this present condition, this invention person Then, EVOH (A), the melting point -- polyamide system resin (B) 160 \*\* or less and me -- a fin unsaturated carboxylic copolymer and/or me -- the resin composition containing a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) finds out agreeing for the above-mentioned purpose, and came to complete this invention.

[0006]

[Mode for carrying out the invention]Below, this invention is described in detail.

[0007][ as EVOH (A) used for this invention ] although not limited in particular -- ethylene content -- 10-70-mol % (further 20-60-mol %.) especially -- the degree of 25-50-mol % and saponification -- more than 90 mol % (further -- more than 95 mol %.) Especially, the thing beyond 99 mol % is used and, less than [ 10 mol % ], this ethylene content Gas-barrier [ at the time of highly humid ] \*\*. Melting fabrication nature falls, if 70-mol % is exceeded conversely, sufficient GASUBARIA nature will not be obtained, and also gas-barrier \*\* heat stability, moisture resistance, etc. fall, and the degree of saponification is not preferred less than [ 90 mol % ].

[0008][ the melt flow rate (MFR) (210 \*\*, 2160g of load) of this EVOH ] When 0.5-100g/10 minutes (further 1-50g/10 minutes, especially 3-35g/10 minutes) are preferred and this MFR is smaller than this range, The thickness accuracy of the molded product which the inside of an extrusion machine will be in a high torque state at the time of fabrication, and extrusion processing becomes difficult, and is acquired when larger than this range falls, and it is not desirable.

[0009]This EVOH (A) is obtained by saponification of an ethylene-vinyl acetate copolymer, and, [ this ethylene-vinyl acetate copolymer ] It is manufactured by the publicly known arbitrary polymerizing methods, for example, solution polymerization, suspension polymerization, emulsion polymerization, etc., and saponification of an ethylene-vinyl acetate copolymer can also be performed by a publicly known method.

[0010]In the range which does not check the effect of this invention, in this invention, may copolymerize the copolymerizable ethylenic unsaturated monomer, and, [ as this monomer ] OREFIN, such as propylene, 1-BUTEN, and iso BUTEN, acrylic acid, Methacrylic acid, crotonic acid, phthalic acid (anhydrous), maleic acid (anhydrous), (Anhydrous) Mono-\*\*\*\* of unsaturated acids, such as itaconic acid, the salt of those, or the carbon numbers 1-18 JIARU

kill ester, Acryl amide, N-ARUKIRU acryl amide [ of the carbon numbers 1-18 ], N, and N-JIMECHIRU acryl amide, Acryl amide, such as 2-acryl amide propanesulfonic acid or its salt, acryl amide propyl dimethylamine, its acid chloride, or the 4th class salt of its, Methacrylamide, N-ARUKIRU methacrylamide of the carbon numbers 1-18, N and N-JIMECHIRU methacrylamide, 2-methacrylamide propanesulfonic acid, or its salt, Vinyl cyanides, such as N-vinyl amide, such as methacrylamide, such as methacrylamide propyl dimethylamine, its acid chloride, or the 4th class salt of its, N-vinyl pyrrolidone, N-vinyl formamide, and N-vinyl acetamide, acrylics nitril, and methacrylic nitril, The ARUKI kana nil ether of the carbon numbers 1-18, hydroxyalkyl vinyl ether, Vinyl ether, such as Alcokey SHIARU kill vinyl ether, VCM/PVC, Vinylic halide, such as a vinylidene chloride, fluoridation vinyl, vinylidene fluoride, and vinyl bromide, Vinylsilane, such as trimethoxy vinylsilane, allyl acetate, an allyl chloride, Allyl alcohol, JIMECHIRU allyl alcohol, bird methyl (3-acryl amide 3-JIMECHIRU propyl)-ammonium chloride, and acryl amide 2-methylpropanesulfonic acid etc. are mentioned. In the range which does not spoil the meaning of this invention, even if urethane-izing, ASETARU-izing, cyano ethylation, etc. back-denature, it does not interfere.

[0011]It is possible also for using two or more sorts of different EVOH(s) as EVOH (A1), and. [ at this time ] ethylene content -- more than 5 mol % (further 5-25-mol %, especially 8-20-mol %), [ differ and ] and/or, the degree of saponification -- more than 1 mol % (further 1-15-mol %, especially 2-10-mol %), when it differs and/or the ratio of MFR uses the blend thing of EVOH which is two (further 3-20, especially 4-15) or more, Since pliability, hot shaping nature, film production stability, etc. improve with GASUBARIA nature held, it is useful. The manufacturing method in particular of two or more sorts of different EVOH(s) (blend thing) is not limited, For example, the method of mixing the mixed solution of the alcohol of each EVOH after the method and saponification which are saponified after mixing each paste of EVA before saponification, or water and alcohol, the method of carrying out after-mixture melt kneading of each EVOH, etc. are mentioned.

[0012]Even if it is required for the melting point to be 160 \*\* or less and the melting point uses polyamide system resin over 160 \*\* as polyamide system resin (B) used for this invention, the effect of this invention cannot be acquired, but 80-150 \*\* is 80-140 \*\* especially preferably still more preferably.

[0013][ as polyamide system resin (B) applied concretely ] Polycapramide (nylon 6), Polly omega-amino heptanoic acid (nylon 7), Polly omega-amino nonanoic acid (nylon 9), the poly UNDE can amide (Nylon 11), Poly lauryl lactam (Nylon 12), polyethylene range amine adipamide (nylon 26), Polytetra ethylene adipamide (Nylon 46), polyhexamethylene adipamide (Nylon 66), Polyhexamethylene SEBAKAMIDO (Nylon 610), polyhexamethylene DODEKAMIDO (Nylon 612), Poly octa methylene adipamide (nylon 8 and 6), PORIDEKA methylene adipamide (nylon 108), Caprolactam / lauryl lactam copolymer (nylon 6/12),

Caprolactam / omega-amino nonanoic acid copolymer (nylon 6/9), Caprolactam / hexamethylene dianmonium horse mackerel PETO copolymer (nylon 6/66), Lauryl lactam / hexamethylene dianmonium horse mackerel PETO copolymer (Nylon 12/66), ethylene diamine adipamide / hexamethylene dianmonium horse mackerel PETO copolymer (nylon 26/66), Caprolactam / hexamethylene dianmonium horse mackerel PETO / hexamethylene dianmonium sebacate copolymer (Nylon 66/610), Ethylene ammonium horse mackerel PETO / hexamethylene dianmonium horse mackerel PETO / hexamethylene dianmonium sebacate copolymer (nylon 6/66/610), Polyhexamethyleneisophthalamide, polyhexamethylene terephthalamide, Hexamethylene isophthalamide / terephthalamide copolymers, or these polyamide system resin Methylene benzoRUAMIN, A thing 160 \*\* or less is mentioned for the melting point among what denatured by aromatic amine, such as METAKISHI range amine, METAKISHIRI range ammonium AJIPETO, etc.

[0014]The melting point expresses here the dissolution peak temperature (\*\*) measured by the heating rate of 10 \*\* / min using a differential scanning calorimeter (DSC).

[0015]Although a technique in particular for the melting point of polyamide system resin to be 160 \*\* or less is not limited, It is preferred to use the copolymer of a specific ratio among the above-mentioned polyamide system resin industrially, and as this copolymer nylon specifically, Nylon 6/66/[ the nylon 6/12, the nylon 6/69, and ] 610, nylon 6/66/610/12, nylon 6 / 66/610 / 11 grades, and its aromatic amine denaturation thing are mentioned, as the concrete brand name marketed -- "friend run CM4000", "friend run CM8000", "friend run CM6541-X3", "friend run CM831", and "friend run CM833" (above) The Toray Industries, Inc. make, "ERUBAMIDO 8061", "ERUBAMIDO 8062S", "ERUBAMIDO 8066" (above) Made in E. I. du Pont de Nemours Japan, "Grilon CF6S", "Grilon CF62BS", "Grilon CA6E", "Grilon XE3381", "Grilon BM13SBB" (above) Made in Ems Japan "UBE7128B", "UBE7028B" (above, Ube Industries, Ltd. make), etc. are mentioned.

[0016][ the amount of heat of fusion ( $\Delta H$ ) measured using the differential scanning calorimeter (DSC) of polyamide system resin (B) (the heating rate of 10 \*\* / min) ] 80 or less (further 5 - 70 J/g, especially 10 - 60 J/g) J/g is preferred, and when this amount of heat of fusion ( $\Delta H$ ) exceeds 80 J/g, it is in the tendency for low-temperature heating extension fabrication nature to fall, and is not desirable. Although the technique in particular for carrying out the amount of heat of fusion of polyamide system resin ( $\Delta H$ ) ing and 80J /or less is not limited, it can be suitably performed by controlling the degree of polymerization in polyamide system resin, a molecular weight, molecular weight distribution, the content of a low molecular weight constituent, the amount of moisture, the amount of residual monomers, etc. industrially.

[0017][ the melt flow rate (MFR) (210 \*\*, load 2160gg) of polyamide system resin (B) ] 1-100g/10 minutes (further 3-80g/10 minutes, especially 5-50g/10 minutes) are preferred, and when this melt flow rate separates from this range, it is in the tendency for low-temperature

heating extension fabrication nature to fall, and is not desirable. Although the technique in particular for making MFR of polyamide system resin into a mentioned range is not limited, either, it can carry out suitably by controlling the degree of polymerization of polyamide system resin, a molecular weight, molecular weight distribution, the content of a low molecular weight constituent, the amount of moisture, the amount of residual monomers, etc. industrially. The polyamide system resin in which structure, composition, and a molecular weight (MFR) differ from molecular weight distribution etc. as polyamide system resin (B) in this invention can be combined, and two or more kinds can also be used.

[0018]me who am used for this invention -- a fin unsaturated carboxylic copolymer and/or me -- a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C) (only) describing it as a copolymer (C) -- it is -- it may be the polymer which copolymerized unsaturated carboxylic acid and/or unsaturated carboxylic ester by making OREFIN into the main ingredients, and also a carboxylic component may be what is called eye ONOMA neutralized with the metal ion (portion). As OREFIN in a copolymer (C), ethylene, propylene, butylene, styrene, etc. are mentioned, for example, among these ethylene is used most suitably.

[0019][ as unsaturated carboxylic acid in a copolymer (C) ] For example, ethylenic unsaturated monocarboxylic acid, such as acrylic acid, methacrylic acid, Etah Kurile acid, and crotonic acid, Ethylenic unsaturated dicarboxylic acid and its anhydrides, such as boletic acid, itaconic acid, maleic acid, maleic acid monomethyl, maleic acid monoethyl, and a maleic anhydride, half ester, etc. are mentioned, among these acrylic acid or methacrylic acid is used most suitably. [0020][ the content of the unsaturated carboxylic acid in a copolymer (C) ] 1 to 30 weight % (further 2 to 25 weight %, especially 3 to 20 weight %) is preferred, and this content, [ less than 1 weight % ] If the effect (improvement of the pinhole-proof nature at the time of crookedness fatigue or GASUBARIA nature) of this invention may become insufficient and 30 weight % is exceeded conversely, it is in the tendency for the heat stability of the resin composition obtained to fall, fabrication nature may worsen, and it is not desirable.

[0021]me -- as unsaturated carboxylic ester in a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C), For example, methyl acrylate, ethyl acrylate, butyl acrylate, methyl methacrylate, Ethyl methacrylate, butyl methacrylate, methacrylic acid 2-ethylhexyl, Cyclohexyl methacrylate, boletic acid monomethyl ester, boletic acid monoethyl ester, etc. are mentioned, among these the ARUKIRU ester beyond C3 of acrylic acid and/or methacrylic acid is used most suitably.

[0022]me -- as for the content of the unsaturated carboxylic ester in a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer (C), it is preferred that it is 2 to 50 weight % (further 4 to 40 weight %, especially 5 to 30 weight %) at the point that the effect of this invention can be acquired more efficiently.

[0023]As for the melt flow rate (MFR) of a copolymer (C), 0.7-25g/10 minutes (the left) are



preferred at 0.3-100g/10 minutes (190 \*\*, 2160g load) and also 0.5-50g/the point of excelling especially in especially the effect of this invention for 10 minutes (the left).

[0024]As above-mentioned eye ONOMA, it is neutralized by the metal ion (portion) and the carboxylic component of a copolymer (C), [ as a metal ion ] Zinc, sodium, potassium, magnesium, calcium, barium, lithium, etc. are specifically mentioned, among these zinc, sodium, and potassium are used most suitably. 5 to 100% (further 10 to 90%, especially 30 to 70%) of the degree of neutralization by the metal ion of a carboxylic component is desirable.

[0025]As for the melt flow rate (MFR) of this eye ONOMA, 0.7-25g/10 minutes (the left) are preferred at 0.3-100g/10 minutes (210 \*\*, 2160g load) and also 0.5-50g/the point of excelling especially in especially the effect of this invention for 10 minutes (the left).

[0026]A copolymer (C) may be a denaturation object containing the carboxyl group produced by making combine unsaturated carboxylic acid or its anhydride chemically by addition reaction, a grafting reaction, etc., As this unsaturated carboxylic acid or its anhydride, maleic acid, a maleic anhydride, fumaric acid, acrylic acid, methacrylic acid, crotonic acid, itaconic acid, citraconic acid, a hexahydro phthalic anhydride, etc. are mentioned, and a maleic anhydride is used suitably especially.

[0027][ the quantity of the unsaturated carboxylic acid contained in this copolymer at this time (C), or its anhydride ] 0.001 to 5 weight % (further 0.01 to 3 weight %, especially 0.03 to 1 weight %) is preferred, and it is in the tendency for the heat stability of the resin composition which will be obtained if conversely large [ deficiently ] in the effect when there are few amounts of denaturation in this denaturation thing to fall, fabrication nature may worsen, and it is not desirable.

[0028]Although the resin composition of this invention comes to contain (A) - (C) like the above and the content rate in particular is not limited, [ the content weight ratio (A/B) of (A) and (B) ] 50 / 50 - 99/1 (further 60 / 40 - 97/3, especially 70 / 30 - 95/5) are preferred, When this weight ratio is smaller than 50/50, GASUBARIA nature may become insufficient, low-temperature heating extension fabrication nature may become insufficient, when conversely larger than 99/1, and it is not desirable.

[0029]The content rate of (C) is 1 - 50 weight section (further two to 30 weight section) to total quantity (A+B) 100 weight section of (A) and (B). It is preferred to consider it as three to 15 weight section especially, and it is in the tendency for the GASUBARIA nature of the heating extension molded product which will be acquired if this content rate is in the tendency for pinhole-proof nature to fall in less than one weight section and exceeds 50 weight sections conversely to fall, and is not desirable.

[0030][ the content weight ratio (B/C) of (B) and (C) ] If this content weight ratio becomes insufficient [ less than 50/50 / low-temperature heating ductility ] and exceeds 99/1 conversely by 50 / 50 - 99/1 (further 55 / 45 - 98/2, especially 60 / 40 - 95/5), it is in the tendency for

pinhole-proof nature to fall, and is not desirable.

[0031]Although the resin composition which consists of above-mentioned (A) - (C) should just blend (A) - (C) ingredient, [ the resin composition ] How to specifically carry out melt kneading after mixing a \*(A) - (C) ingredient by package, \*(A) How to add the (C) ingredient and carry out melt kneading further after carrying out melt kneading of an ingredient and the (B) ingredient, \*(A) How to add the (B) ingredient and carry out melt kneading further after carrying out melt kneading of an ingredient and the (C) ingredient, \*(B) After dissolving uniformly and mixing in the method of adding the (A) ingredient and carrying out melt kneading further, after carrying out melt kneading of an ingredient and the (C) ingredient, and the solvent which can dissolve a \*(A) - (C) ingredient, the method of removing this solvent etc. can be mentioned, and the method of \* is suitably used on production.

[0032]In the above-mentioned melt kneading, a publicly known method is employable. For example, publicly known kneading apparatus, such as kneader Ruder, an extrusion machine, a mixing roll, the Banbury mixer, and Plast Mill, can be used, and it is usually 150-300 \* (further 180-280 \*), it is preferred to carry out melt kneading for 1 minute - about 1 hour, and it is advantageous to use extrusion machines, such as a single axis extrusion machine and a 2 axis extrusion machine, industrially, and it is also preferred to form a vent suction unit, a gear pump device, a screen device, etc. if needed. In order to provide one or more vent holes in an extrusion machine, to draw in under decompression, in order to remove especially moisture and suboutput (thermal cracking low-molecular quantity thing etc.), or to prevent mixing of oxygen to the inside of an extrusion machine, By supplying inactive gas, such as nitrogen, continuously in a hopper, the resin composition which was excellent in the quality by which heat coloring and heat deterioration were reduced can be obtained.

[0033]Although the resin composition of this invention which consists of (A) - (C) is obtained in this way, In this resin composition, acids and the alkaline metals of those, such as acetic acid, boric acid, and phosphoric acid, Also making metal salt, such as alkaline-earth metals and a transition metal, contain The heat stability of a resin composition, It is desirable at the point whose layer indirect arrival nature with adhesive resin when it is considered as long-run fabrication nature and a layered product, heating extension fabrication nature, etc. improve, and especially alkali metal salt and alkaline-earth-metals salt are preferably used in that it excels in the effect.

[0034]As this metal salt, sodium, potassium, calcium, magnesium, etc., Metal salt of inorganic acid, such as organic acid, such as acetic acid, propionic acid, butanoic acid, lauryl acid, stearic acid, oleic acid, and behenic acid, sulfuric acid, sulfurous acid, a carbonic acid, phosphoric acid, is mentioned, and they are acetate, an phosphate, and hydrogen-phosphate salt suitably. As content of this metal salt, it is 5-1000 ppm (further 10-500 ppm) by metal conversion to a resin composition. It is preferred to be especially referred to as 20-300 ppm,

and appearance of a molded product which will be acquired if the content effect may not be enough acquired in less than 5 ppm and this content exceeds 1000 ppm conversely gets worse, and it is not desirable. When salt of two or more sorts of alkaline metals and/or alkaline-earth metals contains in a resin composition, it is preferred that the range of the above-mentioned content has the total. When making boric acid contain, it is preferred to be referred to as 10-10000 ppm (further 20-2000 ppm, especially 50-1000 ppm) by boron conversion. [0035][ method / of making acids and its metal salt containing in a resin composition ] It is not limited, make (A) contain beforehand especially, make it contain simultaneously at the time of a blend of (A) - (C), or, (A) When blending any two sorts of - (C), it can be made to be able to contain, or a resin composition after a blend of (A) - (C) can be made to be able to contain, (B) or (C) can be made to be able to contain beforehand, or these methods can be combined. In order to acquire an effect of this invention more notably, a method which EVOH (A) is made to contain beforehand is preferred at a point of excelling in the dispersibility of acids or its metal salt.

[0036][ as a method which EVOH (A) is made to contain beforehand ] a) Contact the porous deposit thing of EVOH of 20 to 80 weight % of moisture content in solution of acids or its metal salt, After making the method and the uniform solution of I EVOH (water/alcohol solution) which are dried after making acids and its metal salt contain contain acids and its metal salt, Push out in the shape of Strand in solidification liquid, cut Strand subsequently obtained, and, [ as a pellet ] In the time of the manufacture of a method and E EVOH which carries out melt kneading with an extrusion machine etc. after mixing collectively a method, U EVOH and acids which carry out a drying process, and its metal salt, The method etc. which neutralize the alkali (sodium hydroxide, a potassium hydrate, etc.) used at the saponification process with acids, such as acetic acid, have adjusted the quantity of alkali metal salt, such as acids, such as acetic acid which remains, acetic acid sodium, potassium acetate which are subgenerated, with flush processing enough, and carry out it can be mentioned. In order to acquire the effect of this invention more notably, the method of A which is excellent in the dispersibility of acids or its metal salt, I, or E is preferred.

[0037]In the range which does not check the purpose of this invention to this resin composition in this invention, Saturated fat fellows amide (for example, octadecanamide etc.), unsaturated fatty acid amide (for example, oleic amide etc.), screw fatty acid amide (for example, ethylene screw octadecanamide etc.) and fatty acid metal salt (for example, calcium stearate.) low-molecular quantity polyolefin (for example, about 500 to 10,000-molecular weight low molecular weight polyethylene.), such as stearic acid magnesium and zinc stearate or low molecular weight polypropylene etc. -- etc. -- lubricant and mineral salt (for example, hydrotalcite etc.). [ as plasticizers (for example, fatty series polyhydric alcohol, such as ethylene glycol, glycerin, and hexandiol etc.) and oxygen absorbent [ for example, an

inorganic system oxygen absorbent, ] Reduced iron powder and also the thing which added a water absorptivity substance, an electrolyte, etc. to this, aluminium powder, potassium sulfite, photocatalytic oxidation titanium, etc., [ as an organic compound system oxygen absorbent ] Polyhydric phenol, such as hydroquinone, such as ascorbic acid, and also its fatty acid ester, metal salt, gallic acid, and hydroxyl group content phenol aldehyde resin, \*\*\*\*- salicyl aldehyde imine cobalt, tetra-ethylene pentamine cobalt, A cobalt Schiff base complex, porphyrins, a macrocyclic polyamine complex, The coordinate bond object of nitrogen-containing compounds, such as a polyethyleneimine cobalt complex, and a transition metal, a terpene compound, the reaction thing of amino acid and a hydroxyl machine content reducing substance, a triphenylmethyl compound, etc., [ as a polymer system oxygen absorbent ] The coordinate bond object of nitrogen content resin and a transition metal (for example, MXD nylon and cobalt should put together), The blend thing of the third class hydrogen content resin and a transition metal (for example, polypropylene and cobalt should put together), The blend thing of carbon-carbon unsaturated bond content resin and a transition metal (for example, poly butadiene and cobalt should put together), Photooxidation disintegration resin (for example, poly ketone etc.), an anthraquinone polymer (for example, polyvinyl anthraquinone), etc., ], such as what added photoinitiators (for example, benzophenone etc.), peroxide supplementary agents (for example, commercial antioxidant etc.), and deodorizers (for example, activated carbon etc.) in these combination things, heat stabilizer, light stabilizer, an antioxidant, an ultraviolet ray absorbent, colorant, a spray for preventing static electricity, a surface-active agent, antibacteria medicine, anti blocking agents (for example, talc particulates etc.), slip additives (for example, formless silica etc.), fillers (for example, inorganic filler etc.), and other resin (for example, polyolefin.) polyester etc. -- etc. -- it may blend.

[0038]Although it is possible to excel in heating extension fabrication nature, and to excel in pinhole-proof nature and the GASUBARIA nature after crookedness fatigue of an oriented film, and to use for various uses as a monolayer, of course, [ the resin composition of this invention obtained in this way ] It is useful also as a layered product, it is preferred to use at least for one side of the layer which especially consists of this resin composition as a layered product which laminates a thermoplastic resin layer, and a layered product suitable for the practical use to which water resistance, a mechanical property, heat-sealing nature, etc. were given is obtained.

[0039]Hereafter, this layered product is explained. In manufacturing this layered product, laminate other substrates (thermoplastics etc.) to one side or both sides of a resin composition of this invention, but. How to carry out the melting extrusion lamination of other substrates as a laminating method at the film of the resin composition of this invention, a sheet, etc., for example, Conversely, the method of carrying out the melting extrusion lamination of this resin composition at other substrates, the method of co-extruding this resin composition and other

substrates, The method of carrying out the dry lamination of the resin composition (layer) of this invention and other substrates (layer) using publicly known adhesives, such as an organic titanium compound, an isocyanate compound, a polyester system compound, and a polyurethane compound, etc. are mentioned. The melting molding temperature at the time of the above-mentioned melting extrusion is chosen from the range of 150-300 °C in many cases. [0040] As other substrates to apply, thermoplastics is useful and specifically, Straight-chain-shape low density polyethylene, low density polyethylene, super-low density polyethylene, Inside density polyethylene, high-density polyethylene, an ethylene-vinyl acetate copolymer, eye ONOMA and an ethylene propylene (block -- or random) copolymer. An ethylene acrylic acid copolymer, an ethylene acrylic ester copolymer, An ethylene methacrylic acid copolymer, an ethylene methacrylate ester copolymer, A polypropylene and propylene alpha-OREFIN (alpha-OREFIN of carbon numbers 4-20) copolymer, Independent or the copolymer of OREFIN, such as poly BUTEN, the poly pen ten, and the poly methyl pen ten, Or polyolefin system resin of broad sense, such as what these OREFIN was independent or carried out graft denaturation of the copolymer with unsaturated carboxylic acid or its ester, Polyester system resin, polyamide system resin (copolymerization polyamide is also included), Polyvinyl chloride, a polyvinylidene chloride, acrylic resin, polystyrene system resin, vinyl ester resin, a polyester elastomer, a polyurethane elastomer, chlorinated polyethylene, chlorinated polypropylene, an aromatic series, or fatty series poly ketone, Although the poly alcohols produced by returning these, other EVOH(s), etc. are mentioned, From a point of practicality, such as the characteristic (it is especially intensity and appearance) of a layered product, to polypropylene. an ethylene propylene (block -- or random) copolymer and polyamide. Polyethylene, an ethylene-vinyl acetate copolymer, polystyrene, polyethylene terephthalate (PET), the polypropylene where polyethylenenaphthalate (PEN) was used preferably and which excelled [ polyethylenenaphthalate ] especially in ductility, transparency, and pliability, an ethylene propylene (block -- or random) copolymer, and polyethylene are preferred. [0041] Carry out the extrusion coat of other substrates to the molded product of the film of the resin composition of this invention, a sheet, etc., or, When it laminates the film of other substrates, a sheet, etc. using adhesives, [ as this substrate ] Substrates (paper, metallic foil, one axis, a biaxial drawing plastic film or a sheet and its inorganic substance vapor deposition thing, textiles, a nonwoven fabric, metal curdy, wood quality, etc.) arbitrary in addition to the aforementioned thermoplastics are usable. [0042] When the layer composition of a layered product sets a ( $a_1, a_2, \dots$ ) and other substrates, for example, a thermoplastic resin layer, to b ( $b_1, b_2, \dots$ ) for the layer of the resin composition of this invention, If it has a film, a sheet, and the shape of a bottle, [ only not only in the two-layer structure of a/b ] b/a/b, a/b/a,  $a_1/a_2/b$ ,  $a/b_1/b_2$ . Arbitrary combination, such as

$b_2/b_1/a/b_1/b_2$  and  $b_2/b_1/a/b_1/a/b_1/b_2$ , is possible, and further, When setting to R the rig lined layer which consists of a resin composition and a mixture of thermoplastics at least,  $b/R/a$ ,  $b/R/a/b$ ,  $b/R/a/R/b$ ,  $b/a/R/a/b$ , It is also possible to consider it as  $b/R/a/R/a/R/b$  etc. and arbitrary combination, such as a bimetal type, a core (a)-sheath (b) type, a core (b)-sheath (a) type, or an eccentric sheath-core type, is possible for a and b in the shape of a filament. [0043]In the above-mentioned layer composition, [ between each layer ] Can provide an adhesive resin layer if needed and, [ as this adhesive resin ] It is desirable at a point that a layered product which could also use various things and was excellent in ductility is obtained, Although it changes with kinds of resin of b and cannot generally say, Can mention a denaturation olefin system polymer containing a \*\* carboxyl group produced by making combine unsaturated carboxylic acid or its anhydride with an olefin system polymer (an above-mentioned OREFIN simple substance or a copolymer) chemically by addition reaction, a grafting reaction, etc., and specifically, Maleic anhydride graft denaturation polyethylene, maleic anhydride graft denaturation polypropylene, a maleic anhydride graft denaturation ethylene propylene (block -- or random) copolymer. One sort or two sorts or more of mixtures chosen from a maleic anhydride graft denaturation ethylene ethyl acrylate copolymer, a maleic anhydride graft denaturation ethylene-vinyl acetate copolymer, etc. are mentioned as a suitable thing. 0.001 to 3 weight % is desirable still more preferred, and quantity of unsaturated carboxylic acid contained in thermoplastics at this time or its anhydride is 0.03 to 0.5 weight % especially preferably 0.01 to 1weight %. When there are few amounts of denaturation in this denaturation thing, adhesiveness may become insufficient, when conversely large, crosslinking reaction may be caused, fabrication nature may worsen, and it is not desirable. To these adhesive resin, it is also possible to blend resin of rubber elastomer components, such as a resin composition of this invention, other EVOH(s), polyisobutylene, and ethylene-propylene rubber, and also b layer, etc. By blending especially different polyolefin system resin from polyolefin system resin of the mother's body of adhesive resin, adhesiveness may improve and it is useful.

[0044]Although the thickness of each layer of a layered product can be generally said by neither layer composition, the kind of b, a use nor a container form, the physical properties demanded, etc., usually, 5-500 micrometers (further 10-200 micrometers) of a layers are chosen, and, as for b layer, 10-5000 micrometers (further 30-1000 micrometers) and an adhesive resin layer are chosen from the range about 5-400 micrometer (further 10-150 micrometers). At less than 5 micrometers, GASUBARIA nature runs short of a layers, and the thickness control becomes unstable, Conversely, if 500 micrometers is exceeded, ductility and pinhole-proof nature are inferior, and it is not economical, and desirable, Weight will become large, if b layer runs short of rigidity in less than 10 micrometers and exceeds 5000 micrometers conversely, And if layer indirect arrival nature runs short in less than 5

micrometers, and the thickness control becomes unstable and an adhesive resin layer exceeds 400 micrometers conversely economically and undesirably, weight becomes large, and is not economical and preferred.

[0045]Although this layered product is used for the thing of various shape as it is, in order to fabricate in the arbitrary container shape which improves the physical properties of this layered product further, or is made into the purpose, it is also preferred to perform heating extension processing. With heating extension processing, here the layered product of the film and sheet which were heated uniformly thermally, and the shape of a parison with a zipper, a plug, vacuum force, an air pressure force, a blow, etc., Mean the operation uniformly fabricated a cup, a tray, a tube, a bottle, and in the shape of a film, and, [ extension / this ] It may be any of 1 axis extension and a biaxial drawing, and it is [ having extended large magnification way-wise / physical properties / as much as possible ] good, and the extension molded product excellent in GASUBARIA nature which neither a pinhole nor a crack and extension nonuniformity nor \*\*\*\*, DERAMI, etc. produce at the time of extension is acquired.

[0046]As an extension method, what has a high draw ratio is employable among the roll extending method, the tenter extending method, the tubular extending method, the extension blowing method, vacuum forming, \*\*\*\* fabrication, vacuum pressure sky fabrication, etc. In the case of a biaxial drawing, any method of a simultaneous biaxial drawing method and a serial biaxial drawing method is employable. 60-170 \*\* of extension temperature is preferably chosen from the range of about 80-160 \*\*.

[0047]After extension is completed, it is also preferred to perform heat fixation subsequently. Heat fixation performs 80-170 \*\* of for [ 2 to 600 seconds ] grade heat treatment at 100-160 \*\* preferably, it being feasible by a well-known means, and maintaining a strain state for the above-mentioned oriented film. In using for heat contraction packing uses, such as uncooked meat, processed meat, and cheese, After considering it as a product film, without performing heat fixation after extension and storing the above-mentioned uncooked meat, processed meat, cheese, etc. on this film, it is 70-120 \*\* preferably, and heat treatment for about 2 to 300 seconds is performed, heat contraction of this film is carried out, and 50-130 \*\* of adhesion packing is carried out.

[0048]As shape of the layered product obtained in this way, it may be arbitrary, and a film, a sheet, a tape, a cup, a tray, a tube, a bottle, a pipe, a filament, a variant section extrusion thing, etc. are illustrated. The layered product obtained can perform heat treatment, cooling processing, rolling processing, a printing job, dry lamination processing, solution or melting coat processing, bag manufacture processing, deep-drawing processing, box processing, tube processing, split processing, etc. if needed.

[0049]Foodstuffs with common bag and lid material which consist of a container which consists of a cup, a tray, a tube, a bottle, etc. which were obtained like the above, or an oriented film,

etc. Although it is useful as various kinds of containers, such as oil-and-fats foodstuffs, such as fermented foods, such as seasonings, such as mayonnaise and a dressing, and bean paste, and vegetable oil, a drink, cosmetics, medical supplies, detergent, perfumery and cosmetics, industrial chemicals, agricultural chemicals, and fuel, Especially the layered product of this invention Bean paste, pickles, a dried bonito, confectionery, noodles, a peanut, packaging bags, such as a cigarette, and uncooked meat and meat processed goods (a ham, bacon, a Vienna sausage, etc.) -- the contraction packaging film of business. the cup-like container for half-solid-like foodstuffs and seasonings, such as jelly, a pudding, yogurt, mayonnaise, and bean paste, and uncooked meat and meat processed goods (a ham, bacon, a Vienna sausage, etc.) -- it is useful for heating extension fabrication container uses, such as a tray-like container of business.

[0050]

[Working example] Hereafter, a work example is given and this invention is explained concretely. Especially, it shows a weight standard that it is with the inside of a work example "part" and "%", as long as there is no notice.

[0051] About measurement of the melting point of polyamide system resin, it carried out by measuring by the heating rate of 10 ° / min using a differential scanning calorimeter (made by PerkinElmer, Inc. "DSC-7"). About measurement of the boric acid content in EVOH, it carried out by carrying out alkali melting of the EVOH and quantifying boron by an ICP emission-spectrochemical-analysis method. About measurement of alkaline metal content, it carried out after incinerating EVOH by dissolving in chloride solution and quantifying an alkaline metal with an atomic absorption method.

[0052] Work-example 1 EVOH [degree % of 99.5 mol of 34 mol of ethylene content % and saponification, 0.2% of boric acid contains for MFR4.0g/10 minutes (210 °, 2160g of load), Acetic acid sodium 400ppm content] (A) 85 copy, made in polyamide system resin [Ems Japan "Grilon CF6S", Copolymer [ of the nylon 6/12 ], and density 1.05g/cm<sup>3</sup>, 133 ° of melting points, deltaH51 J/g, MFR18g/10 minute (210 °, 2160g of load)] (B) 15 copy, and made in ethylene methacrylic acid copolymer [Mitsui E. I. du Pont de Nemours Pori Kem Cal "NYUKURERU N0908C", Melt kneading of 9% of methacrylic-acid-content and density 0.93g/cm<sup>3</sup> and the MFR8g/10 minute (190 °, 2160g of load)] (C) 10 copy was carried out on condition of the following with the 2 axis extrusion machine, and the resin composition [300 ppm of boron content and sodium 120ppm content] of this invention was obtained.

[0053]

[2 Melting pelletizing conditions by an axial extrusion machine]

Screw inside diameter 30 mm (L/D=30)

Screw shape It has a 100-mm kneading disc in a compression part. Screen mesh 90 / 90mesh screw rotation speed 150 rpm Vent hole Decompression suction is carried out. The nitrogen



gas in a hopper is supplied. Substitution Extrusion temperature C1:190 \*\* C2:200 \*\* C3:210 \*\* C4:220 \*\* C5:220 \*\* AD:210 \*\* D : 210 \*\*[0054]The following evaluations were performed using the resin composition obtained above.

[0055](Ductility) After producing the film on condition of the following and obtaining a 50-micrometer-thick non-oriented film with a single axis extrusion machine using the resin composition obtained above, using the biaxial drawing device, the simultaneous biaxial drawing was performed at 70 \*\* at 30 mm/sec extension speed, and the oriented film (3 times as much length, 3 times as much horizontal extension) was obtained.

[0056]

[the film production conditions boiled and depended on a single axis extrusion machine] Screw inside diameter 40 mm L/D 28 screw-compression-ratio 3.2 T Di Coat hanger type Di width 450mm extrusion temperature C1:190 \*\* H:210 \*\* C2:210 \*\* D:210 \*\* C3:220 \*\* C4:220 \*\* [0057]It measured at a time 20 thickness nonuniformity of the oriented film (about 20-cm angle of the film central part) obtained above in the direction of MD, and the TD direction at intervals of 1 cm, and DEJITARUMAIKUROMETA (made by Sony Corp. "M-30") estimated it by the following standards.

O ... [ ... The tear of a film occurs at the time of extension (thickness is not measured). ] The thickness nonuniformity to average thickness is less than [ \*\*10% ] O... Less than [ \*\* \*\*10 to 20% ] \*\* ... \*\* more than \*\*20% x

[0058](Pinhole-proof nature) The non-oriented film (it judges in A4 size) obtained above 50% 23 \*\* using a Gelboflex tester (made by a physical science industrial company), [ in the atmosphere of RH ] After twisting 440 degrees (3.5 inches) and performing repetition reciprocating movement of + going straight (2.5 inches) 200 times, the number of the pinholes generated in this film was counted, and the following standards estimated. The number of pinholes measured the number of the india inks which applied the india ink on the surface of the film, and oozed out to the opposite side.

O ... [ ... Eleven or more pieces ] Zero piece O ... 1 - 3 piece \*\* ... 4 - 10 piece x [0059](Gas-barrier) The resin composition (a) polyolefin system resin [Japan Polychem make obtained above "nova tech FL6CK", PP] (b) and adhesive resin [Mitsubishi Chemical make "Modic AP P-513V" and maleic anhydride denaturation PP] (c) are supplied to a co-extrusion multilayer film production device, (b) The layered product which has the layer thickness composition of / (c)/(a)/(c)/(b) =150micrometer/30 micrometer/60 micrometer/30 micrometer/150 micrometers is obtained, The simultaneous biaxial drawing was performed for the obtained layered product at 100 mm/sec extension speed using the biaxial drawing device, and the multilayer oriented film (5 times as much length, 5 times as much horizontal extension) was obtained. The obtained multilayer oriented film 50% 23 \*\* using a Gelboflex tester (made by a physical science industrial company), [ in the atmosphere of RH ] Twist 440 degrees (3.5 inches) and,

[ repetition reciprocating movement of + going straight (2.5 inches) ] After carrying out 1000 times, 23 \*\* of the degrees of oxygen penetration of this multilayer oriented film (cc/m<sup>2</sup> and day-atm) were measured under the conditions of RH 50% using the oxygen penetration degree measuring device (made by MOCON "OXTRAN10/50").

[0060]In the work-example 2 work example 1, as a (A) ingredient, 29 mol of ethylene content %, Except having used EVOH of 0.13% of boric acid content, acetic acid sodium 400ppm content, and 90 ppm of potassium acetate content for degree % and MFR of saponification 8.0g/10 minutes (210 \*\*, 2160g of load), it carried out similarly and evaluated similarly. [ of 99.6 mol ] As for the boron content in a resin composition, 100 ppm and the kalium content of 200 ppm and sodium content were 30 ppm.

[0061]In the work-example 3 work example 1, as a (A) ingredient, 38 mol of ethylene content %, Degree % and MFR of saponification 3.0g/10 minutes (210 \*\*, 2160g of load), [ of 99.6 mol ] Except having used EVOH of 0.13% of boric acid content, acetic acid sodium 336ppm content, phosphoric acid 2 hydrogen sodium 92ppm content, and 230 ppm of calcium acetate content, it carried out similarly and evaluated similarly. As for the boron content in a resin composition, 95 ppm and the calcium content of 200 ppm and sodium content were 50 ppm.

[0062]In the work-example 4 work example 1, as a (B) ingredient, the copolymer of "friend run CM8000" by Toray Industries, Inc. [nylon 6 / 66/610/12, density -- 1.12 -- g/cm -- -- three -- -- the melting point -- 131 -- \*\* -- delta -- H -- 40 -- J/g -- MFR -- 25 -- g -- /- ten -- a minute (210 \*\*, 2160g of load) --] -- having used -- except -- the same -- carrying out -- the same -- having evaluated .

[0063]In the work-example 5 work example 1, as a (B) ingredient, Ems Japan "Grilon CA6E" [nylon 6 / 12 copolymer, density -- 1.06 -- g/cm -- -- three -- -- the melting point -- 124 -- \*\* -- delta -- H -- 39 -- J/g -- MFR -- 26 -- g -- /- ten -- a minute (210 \*\*, 2160g of load) --] -- having used -- except -- the same -- carrying out -- the same -- having evaluated .

[0064]In the work-example 6 work example 1, as a (B) ingredient, the copolymer of the "friend run CM6541-X3" by Toray Industries, Inc. [nylon 6/12, density -- 1.11 -- g/cm -- -- three -- -- the melting point -- 135 -- \*\* -- delta -- H -- 40 -- J/g -- MFR -- 12 -- g -- /- ten -- a minute (210 \*\*, 2160g of load) --] -- having used -- except -- the same -- carrying out -- the same -- having evaluated .

[0065]in the work-example 7 work example 1 -- as the (C) ingredient -- eye ONOMA (Mitsui E. I. du Pont de Nemours Pori Kem Cal "Hy Milan S1856" [density 0.93g/cm<sup>3</sup>].) of an ethylene methacrylic acid-acrylic ester copolymer Except having used ionic-species Na] for MFR 1.0g/10 minutes (190 \*\*, 2160g of load), it carried out similarly and evaluated similarly.

[0066]In the work-example 8 work example 1, except having changed the content of the (A) ingredient and the (B) ingredient into 90 copies and ten copies, respectively, it carried out

similarly and evaluated similarly.

[0067]In the work-example 9 work example 1, except having changed the content of the (A) ingredient and the (B) ingredient into 70 copies and 30 copies, respectively, it carried out similarly and evaluated similarly.

[0068]In the work-example 10 work example 1, except having changed the content of the (C) ingredient into 15 copies, it carried out similarly and evaluated similarly.

[0069]In the work-example 11 work example 1, except having changed the content of the (C) ingredient into three copies, it carried out similarly and evaluated similarly.

[0070]In the comparative example 1 work example 1, except not having made a resin composition contain the (B) ingredient, it carried out similarly and evaluated similarly.

[0071]In the comparative example 2 work example 1, except not having made a resin composition contain the (C) ingredient, it carried out similarly and evaluated similarly.

[0072]In the comparative example 3 work example 1, it changed into the (B) ingredient, and except having used the Toray Industries, Inc. make "friend run CM6541-X4" (copolymer [ of the nylon 6/12 ], and density  $1.10\text{g/cm}^3$ , 196 ° of melting points), it carried out similarly and evaluated similarly.

[0073]The evaluation result of a work example and a comparative example is summarized in Table 1, and is shown.

[0074]

[Table 1]

Pinhole-proof nature Ductility The gas-barrier \* work example 1.  $0.54 \pm 0.05$ .  $3.0 \pm 0.5$ .  $7.5 \pm 0.4$ .  $6.0 \pm 0.5$ .  $5.9 \pm 0.6$ .  $0.66 \pm 0.07$ .  $6.5 \pm 0.8$ .  $5.0 \pm 0.9$ .  $5.8 \pm 1.0$ .  $6.4 \pm 1.1$ .  $5.3$  comparative-example 1  $x > 200$   $x > 200$   $3x > 200$ \*

GASUBARIA nature  $\text{cc/m}^2$  and day-atm[0075]

[Effect of the Invention]the resin composition of this invention -- EVOH and the melting point -- polyamide system resin 160 ° or less and me -- a fin unsaturated carboxylic copolymer and/or me -- a fin unsaturated-carboxylic-acid-unsaturated-carboxylic-ester copolymer being contained, and, sake, It excels in the GASUBARIA nature after crookedness fatigue when it excels in ductility and is considered as pinhole-proof nature or a multilayer oriented film, It is useful as packaging materials (foodstuffs, a drink, cosmetics, medical supplies, industrial chemicals, agricultural chemicals, a solvent, fuel, etc.) of various packing uses, and very useful as a layered product with polyolefin system resin especially.

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[Translation done.]